Saskatchewan
Parks, Recreation
and Culture

Hon. Colin Maxwell
Minister

Mercury in Fish: Guidelines for Consumption 1988

What's New in 1988

Consumption Guidelines for the Qu'Appelle River System

Guidelines for consumption of northern pike and walleye caught in Buffalo Pound, Last Mountain, Pasqua, Echo, Katepwa, Mission, Crooked and Round Lakes are now based on the size of the fish (please see Table II for details). These guidelines relate the length of a fish to the potential amount of mercury it contains as well as to the duration of fish consumption.

The additional level of detail is possible because of extensive testing of fish in the Qu'Appelle lakes since 1980. These details will provide anglers with more precise information on the probable mercury content of any fish they catch.

Consumption guidelines based on size of fish will be extended to the Saskatchewan River system in 1989 and to the remainder of the province in subsequent years.

Tobin Lake Walleye and Sauger

Mercury consumption guidelines for walleye and sauger in Tobin Lake are now in the 1.0 — 1.5 ppm limited consumption category. The reason is associated with an increase in the average sizes of these fish and not with an increase in the mercury content of the river.

Northern Lakes

Mercury consumption guidelines for nine lakes have been added to the list of northern lakes. Please consult Table III for details.

Sources of Mercury

Mercury is widespread in the environment and can be found in soils, water, air, plants, and animals. It is easily transferred from one medium to another and also accumulates in food chains.

Most mercury in the environment occurs naturally. Low concentrations can be found in most soils and rocks, usually in association with deposits of lead, zinc, cadmium, copper, silver and gold. These naturally occurring deposits are the most probable cause for elevated levels of mercury in fish in areas remote from industrial activity. There is one such region in northern Saskatchewan located in a roughly triangular area between Wollaston Lake, Amisk Lake, and Pinehouse Lake.

In the past, certain industrial activities in southern Saskatchewan such as the chlor-alkali plant in Saskatoon also released mercury into the environment. In addition, mercury was used as a seed grain treatment to control fungus. Discharges from these sources have now been virtually eliminated, and mercury concentrations in fish caused by industrial discharges should gradually decline.

Relatively small amounts of mercury continue to be used in certain types of electrical and scientific equipment, amalgams in dental fillings, and in fungicides for golf greens. There is no evidence that these limited uses have caused any serious environmental problems.

In southern Saskatchewan the number of waterbodies with warnings on fish consumption due to mercury content should decline due to the controls on the use of mercury. In northern Saskatchewan, the number of lakes with warnings will increase as testing continues in areas with significant natural background levels of mercury.

Uptake of Mercury by Fish

Fish absorb mercury directly from the water, but most is ingested from other aquatic organisms which make up their diet. Fish eliminate mercury very slowly and it therefore accumulates in their muscle tissue and vital organs such as the liver and kidneys.

The longer fish are exposed to mercury in the environment, and the more mercury-contaminated food they consume, the higher the levels of mercury will be in their tissues. Large fish contain more mercury than small fish of the same species. Predators such as walleye, northern pike, and lake trout have the highest levels because their diets consist of other fish which have already concentrated mercury in their tissues.

Mercury Monitoring Program

Fish have been monitored for mercury in Saskatchewan since 1969. The provincial Mercury-in-Fish Committee monitors recreational waters and the federal Department of Fisheries and Oceans tests fish that are caught for commercial sale.

The Mercury-in-Fish Committee is composed of representatives from the provincial Departments of Environment, Health, and Parks, Recreation and Culture. Fish samples are collected by Parks, Recreation and Culture staff and then analyzed by the Provincial Health Laboratory. Data from Canada Fisheries and Oceans are also evaluated. The Committee then develops recommendations for consumption based on these data.

Fish in 352 of Saskatchewan's major lakes, streams, and reservoirs have been tested for mercury content. It has not been possible to test fish in all of Saskatchewan's 94,000 lakes. Instead, the focus in southern Saskatchewan has been on popular recreational fishing areas, commercially fished lakes, and waters near known or suspected sources of pollution. In northern Saskatchewan (north of the 54th parallel) the monitoring program has concentrated on commercially fished lakes and recreational fishing areas.

Many different species of fish have been tested. In general, mercury concentrations are higher in predator species such as walleye, northern pike, and lake trout than they are in species such as whitefish and suckers which feed on invertebrate organisms lower down the food chain. Results have shown that if mercury levels are low in predator species, testing of other species may not be required.

Consumption Guidelines

In 1971, the federal Department of Health and Welfare set 0.5 parts per million (ppm) as the tolerance level for mercury in food in Canada. This meant that fish with less than 0.5 ppm mercury in their tissues could be eaten in unlimited amounts whereas fish with more than 0.5 ppm mercury were not recommended for consumption. In 1984, the guidelines were modified so that fish with mercury between 0.5 and 1.0 ppm in their tissues could be eaten in limited amounts, while fish with mercury in excess of 1.0 ppm were not recommended for consumption.

In 1986, Saskatchewan has adopted revised guidelines, similar to those of Ontario and Manitoba. The new guidelines are broader in scope, and are supported by recommendations of the World Health Organization along with recent medical evidence from studies of mercury poisoning in other countries.

Under the 1986 guidelines, fish with an average mercury concentration of less than 0.5 ppm may be eaten in unlimited amounts. **Fish with mercury concentrations of 0.5 — 1.5 ppm may be eaten in limited amounts. There are now two categories for limited consumption: 0.5 — 1.0 ppm and 1.0 — 1.5 ppm. Recommended consumption for these categories differs, and is based on the amount of fish consumed over a given unit of time.**

If, for instance, fish are a regular part of the diet only one meal per week is recommended when fish contain 0.5 — 1.0 ppm of mercury. At the higher concentration of 1.0 — 1.5 ppm no more than one meal every 2 weeks is recommended.

For those who do not eat fish regularly but consume them while on vacation, the recommended consumption is based on the duration of the vacation. The amount of fish with mercury in excess of 0.5 ppm that may be consumed in a period of one week differs from that of 2 weeks, 3 weeks or longer periods. Fishing holidays should be spaced at least 6 months apart if the recommended maximum number of meals of fish with mercury in excess of 0.5 ppm has been consumed.

Table I presents the levels of consumption recommended over varying lengths of time in relation to the amount of mercury in the fish.

No one should eat fish with mercury concentrations of more than 1.5 ppm. Children and pregnant women should not eat fish containing mercury in excess of 0.5 ppm.

Tables II and III contain information on lakes where fish have been found to contain mercury in excess of the 0.5 ppm tolerance level recommended by federal authorities. Table II summarizes data for lakes in the Qu'Appelle River system; Table III summarizes data for the remainder of Saskatchewan.

The data in Table II are stated in terms of the species and length of fish. Length is the fork length, that is, the length from the tip of the snout to the fork in the tail. Because larger fish contain more mercury than smaller fish of the same species, the guidelines indicate the sizes of pike and walleye which can be eaten in unlimited amounts and the sizes which should be consumed in limited quantities. Thus for Buffalo Pound and/or Last Mountain Lakes, for example, walleye smaller than 49 cm (19 inches) may be eaten in unlimited amounts whereas walleye larger than 80 cm (31 inches) should not be eaten at all. Walleye longer than 49 cm and shorter than 80 cm should only be eaten in limited amounts according to the guidelines in Table I.

Table I

Guidelines for Consuming Fish Containing Mercury

Duration of Fish Consumption	0.5 – 1.0 ppm mercury	1.0 – 1.5 ppm mercury	Over 1.5 ppm mercury
One Week	10 meals per week	7 meals per week	No Consumption Recommended
Two weeks	5 meals per week	4 meals per week	No Consumption Recommended
Three weeks	4 meals per week	3 meals per week	No Consumption Recommended
Long-term Consumption	1 meal per week	1 meal per 2 weeks	No Consumption Recommended

1 meal = .5 lbs (.23 kg) of fish

Table II

Mercury Levels in Fish from the Qu'Appelle River System

Waterbody	Species	Less than 0.5 ppm	0.5 – 1.0 ppm	1.0 – 1.5 ppm	Over 1.5 ppm
		Unlimited consumption	Limited consumption	Limited consumption	No consumption recommended
Buffalo Pound and Last Mountain Lakes	Walleye	less than 49 cm	49-69 cm	69-80 cm	longer than 80 cm
		(less than 19 inches)	(19-27 inches)	(27-31 inches)	(longer than 31 inches)
	Pike	less than 76 cm	76-104 cm	104-120 cm	longer than 120 cm
		(less than 30 inches)	(30-41 inches)	(41-47 inches)	(longer than 47 inches)
Pasqua, Echo, Katepwa and Mission Lakes	Walleye	less than 32 cm	32-53 cm	53-63 cm	longer than 63 cm
		(less than 13 inches)	(13-21 inches)	(21-25 inches)	(longer than 26 inches)
	Pike	less than 56 cm	56-72 cm	72-80 cm	longer than 80 cm
		(less than 22 inches)	(22-28 inches)	(28-32 inches)	(longer than 32 inches)
Crooked and Round Lakes	Walleye	less than 42 cm	42-55 cm	55-63 cm	longer than 63 cm
		(less than 16 inches)	(16-22 inches)	(22-25 inches)	(longer than 25 inches)
	Pike	less than 70 cm	70-86 cm	86-96 cm	longer than 96 cm
		(less than 27 inches)	(27-34 inches)	(34-38 inches)	(longer than 38 inches)

Table III

Mercury Levels in Fish From Saskatchewan Waterbodies

Southern Saskatchewan

Waterbody	0.5 – 1.0 ppm Limited Consumption	1.0 – 1.5 ppm Limited Consumption	Over 1.5 ppm No Consumption Recommended
Saskatchewan River System			
North Saskatchewan River	Walleye, Sauger, Goldeye		
South Saskatchewan River			
Downstream from Lake Diefenbaker*		Pike, Walleye, Sauger	Nil
Upstream from Lake Diefenbaker*	Sauger		
Saskatchewan River			
Tobin Lake	Pike, Walley, Sauger		
Cumberland Lake	Sauger		
Other Waterbodies			
Anglin Lake	Walleye		
Chitek Lake	Walleye		
Christopher Lake	Walleye		
Fishing Lake (near Wadena)	Walleye		
Lake of the Prairies (Shellmouth Reservoir)	Walleye, Sauger		Nil
Nelson Lake (near Preeceville)	Walleye		
Thomson Reservoir (near LaFleche)	Walleye		
Wolseley Reservoir	Walleye		

*Levels for Lake Diefenbaker are below 0.5 ppm and no restrictions in consumption are in effect.

Northern Saskatchewan

Waterbody	Location				0.5 – 1.0 ppm Limited Consumption	1.0 – 1.5 ppm Limited Consumption	Over 1.5 ppm No Consumption Recommended
	Latitude °	′	Longitude °	′			
Clearwater River Drainage Basin							
Careen Lake	57	00	108	11	Pike, Walleye		
Churchill River Drainage Basin							
Bleasdell Lake	56	35	102	20	Walleye		
Budd Lake	55	04	104	39	Walleye		
Charcoal Lake	58	49	102	22	Walleye		
Colt Lake	55	44	102	46	Pike, Walleye		
Colwell Lake	55	05	104	41	Pike		
Davin Lake	56	50	103	40	Walleye		
Drinking Lake	55	24	104	12	Pike		
Eulas Lake	55	54	105	38		Walleye	
Forbes Lake	55	51	104	44	Lake trout, Walleye		
Garth Lake	56	45	102	09		Pike, Walleye	
Gee Lake	55	11	103	22	Walleye		
Guilloux Lake	55	44	102	35	Pike, Walleye		
Guyader Lake	54	38	102	54	Walleye		
Gwillim Lake	56	57	107	15	Pike, Walleye	Lake trout	
Hardy Lake	55	35	106	24	Pike		
Highway Lake	55	45	102	38	Pike		
Holt Lake	56	16	106	50			Lake trout
Hollowell Lake	55	33	105	44	Lake trout		
Hood Lake	55	38	104	22	Pike	Walleye	
Hunt Lake	55	24	104	41	Pike		
Irvine Lake	56	59	102	41			Pike
Johnson Lake	57	26	104	11	Pike, Walleye		
Kamatsi Lake	56	10	102	15	Pike	Walleye	
Kamuchawie Lake	56	18	101	59	Pike, Walleye		
Kemp Lake	55	39	104	17	Walleye		
Kennedy Lake	56	14	102	21	Pike	Walleye	
Kyaska Lake	56	16	102	29	Pike, Walleye		
Larsen Lake	58	04	103	05	Walleye		
Levine Lake	55	51	107	25	Walleye		
Loon Lake	55	51	102	00	Walleye		
Lovell Lake	55	08	103	14	Pike, Walleye		
Maclean Lake	55	55	104	10	Walleye		
Marchel Lake	55	22	102	44	Pike		
Miners Lake	55	35	106	20	Pike, Walleye		
Mountney Lake	55	42	105	07	Walleye		
Nataweuse Lake	55	17	103	36	Pike, Walleye		
Nokomis Lake	57	00	103	00	Lake trout		
Ohoo Lake	55	22	102	31	Walleye		
Oliver Lake	56	56	103	22	Lake trout		
Pagato Lake	56	08	102	30	Pike	Walleye	
Paull Lake	56	08	104	48	Lake trout	Pike, Walleye	
Peter Lake	57	15	103	53	Pike, Walleye		
Phelan Lake	55	13	102	13	Walleye		
Philion Lake	54	36	106	39	Walleye		
Pikoo Lake	55	32	102	40	Pike		

Northern Saskatchewan — (continued)

Waterbody	Location				0.5 — 1.0 ppm Limited Consumption	1.0 — 1.5 ppm Limited Consumption	Over 1.5 ppm No Consumption Recommended
	Latitude °	'	Longitude °	'			
Reeds Lake	55	34	102	36	Pike		
Renton Lake	55	28	104	23	Walleye		
Sim Lake	55	27	104	42	Walleye		
Sokatisewin Lake	55	30	102	25	Pike		
Sotkowy Lake	55	36	104	24	Pike, Walleye		
Spalding Lake	57	14	103	20	Lake trout, Pike Walleye		
Steephill Lake	55	58	103	08	Pike		
Stilborn Lake	55	08	104	01	Pike		
Stusiak Lake	55	42	105	20	Walleye		
Syntak Lake	55	25	103	03		Walleye	Pike
Tapeese Lake	55	24	103	04	Pike		
Tomahawk Lake	55	25	102	37	Walleye	Pike	
Tomison Lake	56	12	102	21	Pike, Walleye		
Topascom Lake	55	41	102	59	Pike		
Wakisew Lake	54	44	102	43	Pike, Walleye		
Wapus Lake	56	27	102	12	Pike, Walleye		
Waskuhikan Lake	55	36	102	18	Pike, Walleye		
Wathaman Lake	56	55	103	43	Pike		
Wintego Lake	55	35	102	52	Pike		
MacKenzie River Drainage Basin							
Ford Lake	57	19	105	53	Walleye		
Pipestone Lake	57	54	106	35	Pike, Walleye		
Wapata Lake	58	51	105	43	Pike		
Wollaston Lake	58	15	103	20	Walleye		
Wynne Lake	58	07	104	02	Walleye		